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| APPLICATION NO.           | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------------|-------------|----------------------|---------------------|------------------|
| 10/799,051                | 03/11/2004  | Giovanni Gilardi     | AVAN/001112         | 6732             |
| 47389                     | 7590        | 06/16/2006           | EXAMINER            |                  |
| PATTERSON & SHERIDAN, LLP |             |                      | CHIAM, DINH D       |                  |
| 3040 POST OAK BLVD        |             |                      | ART UNIT            |                  |
| SUITE 1500                |             |                      | PAPER NUMBER        |                  |
| HOUSTON, TX 77095         |             |                      | 2883                |                  |

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/799,051

Applicant(s)

GILARDI ET AL.

Examiner

Erin D. Chiem

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 28 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7,9-18 and 20-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-18 and 20-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

This office action is in response to the amendment filed on March 28, 2006. Claims 8 and 19 are canceled, and currently claims 1-7, 9-18, and 20-22 are pending.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 7, 9-12, 14-16, 18, and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishimura et al. (US 5,602,672 hereinafter "Ishimura").

Regarding claims 1, 9-11, Ishimura teaches a light modulator module comprising a semiconductor modulator chip (see Fig. 6; 1 and col. 7, lines 7-10) and a microwave input chip (3), formed of alumina, coupled to the modulator chip having a thin film resistor (5), see also col. 7, lines 46-47. For further clarification, element number 4 provides the connection between the thin film resistor to the RF connector to the RF electrode of the modulator chip.

Regarding claims 3-5 and 14-16, Ishimura further teaches the microstrip line in the microwave input chip (3) and the thin film resistor (5) being placed in the microstrip line; wherein the microstrip line is a straight line. The recitation of "the microwave input chip" is defined in the Specification in the Summary of Invention on page 4 paragraph [0007]. Applicant defines the microwave input chip is a microwave thin film resistor on an accessory connection

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chip located between the RF connector of the microwave input and the RF electrode of the Lithium Niobate chip, thus, Ishimura's chip (3) meets the definition of the microwave input chip without explicitly disclosing in the similar terms. Furthermore, the coplanar waveguide is an alternative term in the art referring to the microstrip; the type of waves that the microstrip guides is a microwave.

Regarding claims 7 and 18, the modulator chip 1 is bonded by the bonding pad 21, 22, and the wire 10.

Regarding claim 12, employing lumped resistance is implicitly anticipated by Ishimura. In Figure 1(b), clearly the network analysis disclosure implies that conventional lumped resistor maybe employed. However, Ishimura further teaches the improvement of impedance matching by employing a thin-film resistor since the resistance is easily controllable by increasing or decreasing the controlling signal to the thin-film resistor. Prior to the knowledge of thin-film resistor, lumped resistors are used, therefore, it is necessary that if without the thin-film resistor, lumped resistor must be used to provide impedance in the network.

Regarding claim 21 and 22, thin film resistors are routinely function in the low resistance range since high resistance will easily damage the resistors. Thus it is understood in the art that thin film resistors are made in the range of a few ohms.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimura in view of Roxlo (US 4,863,245 hereinafter "Roxlo"). Ishimura teaches light modulator module comprising a semiconductor modulator chip (Fig. 6; 1) and a microwave input chip (3), formed of alumina, coupled to the modulator chip having a thin film resistor (5).

However, Ishimura does not explicitly teach the modulator is formed of lithium-niobate. however, Lithium Niobate is a well-known semiconductor compound.

Roxlo teaches a superlattice electrooptic device having a superlattice layer modulator (Fig. 11 (62)). The modulator is made of lithium-niobate for the purpose of integrating with other opto-electronics by depositing the lattice as a layer onto the same chip as a laser diode (col. 11, lines 3-13).

Since Ishimura and Roxlo are both from the same field of endeavor, the purpose disclosed by Roxlo would have been recognized in the pertinent art of Ishimura.

It would have obvious to one having ordinary skill in the art to integrate the laser diode and the modulator onto a single chip from the teaching of Roxlo. **The motivation** for forming the modulator from lithium-niobate is for its superlattice properties that allows one having ordinary skill in the art to deposit it onto a substrate as a thin layer at a low temperature without lattice matching constraints.

Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishimura In applicant's disclosure [0019], the limitation of the curved path microstrip line was taught as a design choice since there applicant does not further disclose the advantage or significance of the coplanar line comprises a curved line. **The motivation** for implementing a curved coplanar line

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instead of a straight coplanar line is that applicant does not have chip surface area constraint in the design process. Examiner's contention of this obvious choice in design can be overcome if applicant establishes unexpected results between curved and straight path microstrip lines as claimed.

*Response to Arguments*

Applicant's arguments filed March 28, 2006 have been fully considered but they are not persuasive.

Applicant's only arguments are as follows:

1. Ishimura fails to show a modulator chip having low impedance and an RF electrode.
2. Ishimura fails to disclose a microwave input chip having a thin film resistor for connecting a RF connector to the RF electrode of the modulator chip.

Examiner's responses to applicant's arguments are as follows:

1. Ishimura clearly discloses a modulator chip as further clarified in the above rejection. Regarding the limitation of "low impedance" examiner considers the limitation is met since the structural limitation is anticipated by Ishimura. Although Ishimura is silent whether the electrode is RF or not, however, it is inherent that electrodes comprise of metal and metal is capable of carrying, transmitting, and receiving radio frequency, thus the electrodes that Ishimura discloses are RF electrodes.
2. Reference number '3' is a microwave input chip. As explained in the first response, Ishimura discloses RF electrodes and examiner respectfully point out another inherency; microwaves are radio waves. Therefore, the broadly claimed language of

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a microwave input chip is anticipated by Ishimura. Regarding the functional limitation "configured to increase the total input impedance of the modulator," examiner did not give patentable weight to such functional recitation in that is not further limiting the structural features.

It is respectfully pointed out that in so far as applicant has not argued rejection(s) of the limitations of dependent claim(s), applicant has acquiesced said rejection(s).

***Contact Information***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

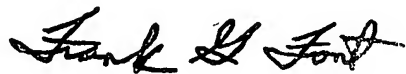
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Erin D Chiem  
Examiner  
Art Unit 2883



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